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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 12/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/743,962

Applicant(s)

KURISAWA, ISAMU

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-9, 11 and 13 is/are rejected.
- 7) ☐ Claim(s) 10, 12, 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-15, drawn to a collector for a battery, classified in class 429, subclass 245.
- II. Claims 16-19, drawn to a process for manufacturing a lead acid battery, classified in class 29, subclass 623.1.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case a storage battery having the claimed collector may be made by another and materially different process. Specifically, the collector may be used in many types of lead acid storage batteries, not just those formed by the process steps of the instant claims. Regarding claim 19, the collector may be heat-fused, welded or formed as a unitary structure with the battery outer case.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

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During a telephone conversation with Mark Boland on 11/27/02 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-19 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

Claims 5-15 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. See MPEP § 608.01(n). For the purposes of this Office Action claims 7, 10, 11 and 13 will be examined as if they depended only upon claim 1.

Claims 14 and 15 are objected to because it is unclear how they incorporate the collector of claim 1. Specifically, claim 14 recites “bipolar type electrodes each comprising a positive active material provided on one side of *a collector* for storage battery and a negative active material provided on the other side”. If Applicant is intending to claim that “a collector” of claim 14 is the collector of claim 1, Examiner suggests the claim be amended to recite “said collector” or “the collector”. Similarly, it is unclear if the “one or two collectors” recited in claim 15 are intended to be the collector of claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 7 and 11 rejected under 35 U.S.C. 102(b) as being anticipated by Terada et al., US 5,024,908.

Terada teaches a Sn or Pb/Sn alloy applied to the surface of a collector to make a lead storage battery that is improved in terms of its chargeability upon left overdischarge. See abstract. Sn exists on the collector in the form of an oxide, SnO₂ (col. 2, lines 37-45). The collector may be a lead alloy (col. 1, lines 58-66).

Thus the claims are anticipated.

Claims 1, 5 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Fiorino et al., US 5,521,029.

Fiorino teaches a current collector with a coating of titanium suboxide thereon for a lead acid battery. See abstract. Fiorino relates to the formation of a corrosion-resistant coating on lead, lead alloy, lead oxide, and other metal surfaces exposed to sulfuric acid environments, such as surfaces of lead-acid battery components (col. 1, lines 8-11).

Thus the claims are anticipated.

Claims 1-4, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Gao US 5,616,437.

Gao teaches a current collector having a layer of electrically conductive metal oxide on at least one surface of the current collector (abstract). Typically, the current collector is a metal foil

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or a conductive plastic (col. 1, line 67-col. 1, line 1). The metal oxide can be derived from any suitable metal(s) that form stable oxides. Most preferred are indium and tin which form In_2O_3 and SnO_2 , respectively (col. 4, lines 35-52). Methods of producing the metal oxide layer include chemical deposition, chemical vapor deposition (CVD), and reactive sputtering (col. 4, line 66-col. 5, line 24).

Thus the claims are anticipated.

Claims 1, 5, 7 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Will, US 4,326,017.

Will teaches a grid for a lead acid battery having an electrically conducting substrate (collector) with a coating of semiconducting metal oxide (abstract). The substrate may be tin or a tin alloy (col. 2, lines 22-25). The semiconducting metal oxide coating can be composed of a doped or undoped semiconducting metal oxide. Metal ions having a valence lower than that of the metal ion component of the semiconducting oxide and anions such as fluoride (F^-) are useful as dopants. Antimony ions or fluoride ions are especially useful dopants for SnO_2 (col. 3, lines 12-35). The coating of semiconducting oxide can be formed on the surface of the substrate by a number of conventional techniques (col. 3, lines 36-38). Example 1 teaches 200 g of SnCl_4 and 100 g of NH_4F were used to form the coating. Example 3 teaches 200 g of SnCl_4 and 100 g of Sb_2Cl_3 were used to form the coating.

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 and 13 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively, unpatentable over Will, US 4,326,017.

Will teaches a grid for a lead acid battery having an electrically conducting substrate (collector) with a coating of semiconducting metal oxide (abstract). The substrate may be tin or a tin alloy (col. 2, lines 22-25). The semiconducting metal oxide coating can be composed of a doped or undoped semiconducting metal oxide. Metal ions having a valence lower than that of the metal ion component of the semiconducting oxide and anions such as fluoride (F-) are useful as dopants. Antimony ions or fluoride ions are especially useful dopants for SnO₂ (col. 3, lines 12-35). The coating of semiconducting oxide can be formed on the surface of the substrate by a number of conventional techniques (col. 3, lines 36-38). Example 1 teaches 200 g of SnCl₄ and 100 g of NH₄F were used to form the coating and active material was applied. Example 3 teaches 200 g of SnCl₄ and 100 g of Sb₂Cl₃ were used to form the coating and active material was applied.

Thus the claims are anticipated.

The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. Thus, whether the coating is applied by sputtering, CVD, spray coating or any other method of coating the substrate is used,

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the coated substrate, as an end product, is the same. Furthermore, the pressure limitation of claim 13 is a product-by-process limitation. The pressure at which the active material is applied during manufacture of the battery is considered obvious.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Will, US 4,326,017.

See discussion of Will above.

Will does not explicitly states the mole percent of Sb or F based on the amount of moles of Sn and Sb or F in the tin oxide coating.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Will teaches that coating a metal substrate for use in a lead acid battery with tin oxide doped with Sb or F is well known in the art. Will states that the dopant materials are incorporated into the semiconducting metal oxides to increase the electrical conductivity of the metal oxide (col. 3, lines 19-22) and that suitable doping of the semiconducting oxides often increases the magnitude of their electrical conductivity by many orders of magnitude (col. 3, lines 31-34). Thus in view of the teachings of Will one of skill would find it obvious to vary the amount of dopant in the semiconducting metal oxide material in order to obtain the desired electrical conductivity of the coating.

Allowable Subject Matter

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Claims 10, 12, 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the claims are directed toward a collector for a lead acid battery having a coating of an electrically conductive ceramic. The electrically conductive ceramic is a silicon compound as recited by claim 10. The prior art does not teach the electrically conductive ceramic of claim 10. Claim 15 states that a collector surface that is free of active material forms at least a part of the outer case of a storage battery. The prior art does not teach a battery outer case formed, at least partially, by a collector. The prior art does not teach a bipolar electrode structure having a current collector with positive active material on one side and negative active material on the opposite side. The coated collectors of the prior art are grid structures that would not function if positive active material was applied on one side and negative active material was applied on the opposite side

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

December 2, 2002



CAROL CHANEY
PRIMARY EXAMINER